SPREADER BAR

I.D. Nº 36 COLOR OF BAR : Aluminum

LOAD CAPACITY PAINTED ON BAR 1600 ~~TONS~~. LBS

DATE CAP. & I.D. Nº PAINTED ON BAR 36

DATE OF LAST LOAD TEST. 6-28-90

TEST LOAD WEIGHT 2000 ~~TONS~~ (2) "F" Blocks

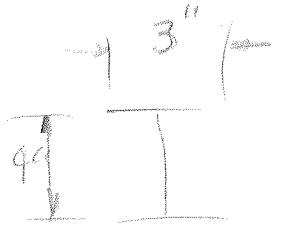
TEST LOAD % 125%

STRESS CALCULATIONS :

DONE BY N. Boser

DATE 6-19-90

REMARKS :



$S = 3.36$

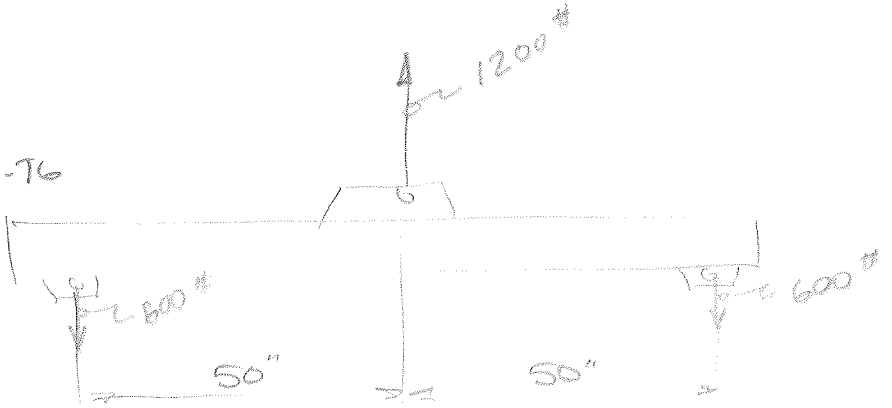
MAT'L: = 6061-T6

TENSION ALLOWABLE
11,000 psi

COMP. ALLOWABLE

$\frac{L_e}{r_y} = \frac{100}{.79} = 135.1$

$\frac{87{,}000}{135.1} = 4769$ psi



$M_{MAX} = 600 \times 50 = 30000$ in. lb.

$F_b = \frac{M}{S} = \frac{30{,}000}{3.36} = 8929$ psi.

$F_{ALLOWABLE} = \frac{12 \times 10^6}{l_e d / A_s} = \frac{12 \times 10^6}{100 \times 4.598} = 26098$ psi use 12,000

$F_b = 8929$ psi $< 12{,}000$ psi.

TRY 1600 lb CENTER LIFT

$M_{MAX} = 800 \times 50 = 40{,}000$ in. lb.

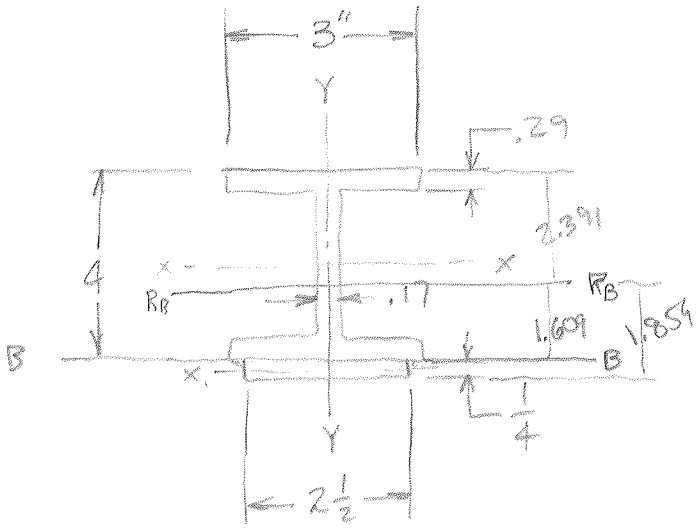
$F_b = \frac{40{,}000}{3.36} = 11905$ psi $< 12{,}000$ psi

$\therefore$ "OK"

$\delta = \frac{Pl^3}{48EI} = \frac{1600 \times 100^3}{48 \times 10 \times 10^6 \times 6.71} = .497"$

$\delta_{AT\ 2000\ LB} = .621"$

$\frac{l_e}{r} = \frac{100}{1.52} = 65.8$



$I_{xx} = 6.71 \text{ in}^4$

$I_{x_1x_1} = \frac{bh^3}{12} = \frac{2.5 \times .25^3}{12} = .003255$

$\Sigma A r_B = 2.375(2) + .625(.125)$

$= 3(r_B)$

$r_B = 1.609375$

$I_{R_BR_B} = 6.71 + 2.375(.152587) + .003255 + .625(3.008)$

$I_{R_BR_B} = 8.9556$

$F_{b_{TOBOW}} = \frac{Mc}{I} = \frac{30{,}000 \times 2.391}{8.9556} = 8010 \text{ psi}$

$F_{b_{comp}} = \frac{Mc}{I} = \frac{30{,}000 \times 1.859}{8.9556} = 6227 \text{ psi}$

$F_{b_{TGW.\ Allowable}} = 11{,}000 \text{ psi}$

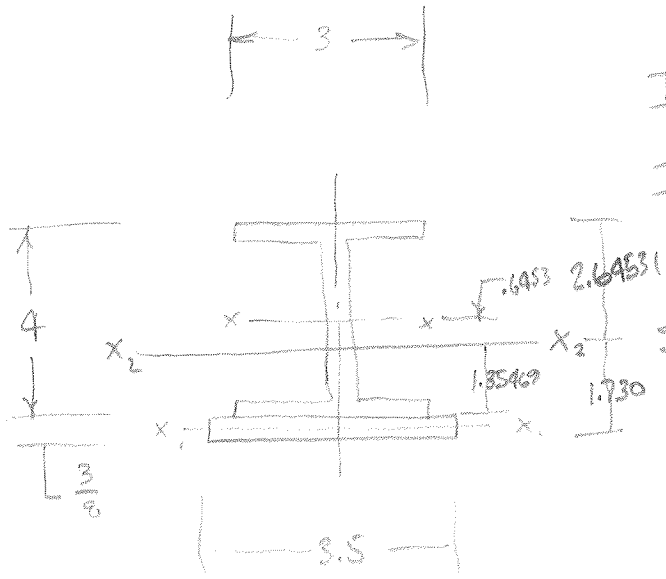
$8010 < 11000$

$\therefore$ N.G.

$F_{b\ comp.\ allow} = \frac{87{,}000}{(Lb/r_y)^2} = \frac{87000}{(100/.738)^2} = 4743 \text{ psi} > 6227$ N.G.

$I_{yy} = 1.31 + \frac{.25 \times 2.5^3}{12} = 1.6355$

$R_y = \sqrt{\frac{I_{yy}}{A_y}} = \sqrt{\frac{1.635}{3}} = .738$



$I_{xx} = 6.71 \text{ in}^4$

$I_{x_1x_1} = \frac{bh^3}{12} = \frac{3.5 \times .375^3}{12} = .01538$

$\Sigma A\bar{d} = 2.375 \times 2 + 1.3125(.187)$

$= 3.6875(\bar{d})$

$\bar{d} = 1.35469$

$I_{x_2x_2} = 6.71 + 2.375\underset{.4164}{(.6453)^2} + 1.3125\underset{2.3777}{(1.542)^2} + .01538$

$I_{x_2x_2} = 10.835$

$F_{b_{TEN}} = \frac{Mc}{I} = \frac{30{,}000 \times 2.64531}{10.835} = 7324 \text{ psi} < 11{,}000 \text{ psi}$ ALLOWABLE

$\therefore$ "OK"

$F_{b_{comp}} = \frac{30{,}000 \times 1.730}{10{,}835} = 4790 \text{ psi}$

$I_{yy} = 1.31 + \frac{bh^3}{12} = 1.31 + \frac{.375 \times 3.5^3}{12} = 2.65 \text{ in}^4$

$(r_y)^2 A = I_{yy} \qquad r_y = \sqrt{\frac{I_{yy}}{A}} = \sqrt{\frac{2.65}{3.6875}} = \sqrt{.7186}$

$r_y = .8477$

$F_{b_{comp.Allow}} = \frac{87{,}000.00}{\left(\frac{100}{.8477}\right)^2} = 6252 \text{ psi}$

$4790 \text{ psi} < 6252 \text{ psi}$

$\therefore$ "OK"

$\tau = \frac{Vay}{It}$

$V = 1000$ lb.

$I = 10.835$ in^4

$t = 3$

$a = 3.5 \times .375 = 1.3125$

$y = 1.73 - .187 = 1.543$

$\tau = \frac{1000 \times 1.3125 \times 1.543}{10.835 \times 3} = 62.3$ psi

$f = \tau t = 62.3 \times 3 = 187$ lb/in.

$w = \frac{187}{9600} = .019''$ Fillet

3/16 Fillet will be use $\therefore \frac{.019}{.187} = 10.4\%$

#36

7-6-90